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THE TENTH INTERNATIONAL GEOLOGICAL CONGRESS.

BY

E. O. HOVEY.

The Tenth International Geological Congress met in the building of the Instituto Geológico Internacional, Mexico City, from the 6th to the 14th of September inclusive, under the protection of President Diaz, and the honorary presidency of Sr. A. Aldasoro, Minister of Fomento, Colonization and Industry. The officers of the Congress were: President, Dr. José G. Aguilera, Director of the Geological Survey of Mexico; vice-presidents from each of the countries represented at the Congress; general secretary, Dr. Ezequiel Ordoñez of the Geological Survey of Mexico; and treasurer, Dr. J. D. Villarello, likewise of the Mexican Survey. More than 300 of the 500 members of the Congress were enrolled as being present at the meetings or taking part in the excursions. Twenty-one nationalities were represented among the delegates in attendance. About thirty papers were read in full or in abstract during the sessions in addition to the reports of the several standing committees, and twenty-eight papers were listed in the official programme for reading by title only. The extemporaneous discussions in the sessions of this Congress were particularly full, interesting, and valuable.

The opening session was held in the "Salon des Actes" of the National School of Mines, and was an impressive function, with the President of the Republic, Ministers of State, members of the Diplomatic Corps, and present and past officers of the Geological Congress occupying the platform, and with many prominent citizens of Mexico present with the congressists in the audience. After the addresses of welcome, the election of permanent officers, and the adoption of the programme voted by the council, the Congress adjourned to hold its scientific sessions at the new building of the Instituto Geológico Nacional. The first of these sessions was given over to communications on miscellaneous subjects, and the following papers were read: "Ueber das ältere Mesozoicum Griechenlands," by Doctor C. Renz of Breslau; "The Onyx Deposits at Etla, State of Oaxaca," by Dr. K. Keilhack of Berlin; and "On the Concurrence and Inter-relation of Volcanic and Seismic Phenomena," by Professor A. Heilprin of Philadelphia.

Professor Heilprin's general conclusions were that a broad inter-relation exists between volcanic and seismic phenomena generally; that inter-related eruptions and earthquakes may occur at places hundreds, or even thousands, of miles apart; that tectonic earthquakes are only doubtfully to be distinguished from those of volcanic origin; that seismic and volcanic disturbances seem to be the expression of one common interior telluric strain or condition, and that this condition may in some or many cases be clearly associated with a pronounced magnetic or electro-magnetic quality of the planet; that superficial movements of the crust in connection with earthquakes are effects, not causes of disturbances. The paper was discussed by Messrs. Lawson, Becker, and Reid, none of whom could accept the conclusions of the author.

A report that will be of particular interest to American geologists was that of the committee appointed by the Geological Society of America at the Ottawa meeting (1905) to prepare a general geological map of North America. The committee consisted of Messrs. I. C. Russell (chairman), J. G. Aguilera, Bailey Willis, F. D. Adams, and C. W. Hayes. The report consisted of the completed map and two explanatory pamphlets by Messrs. Willis and Aguilera. The United States Geological Survey furnished the funds needed for publication, but the Mexican Government contributed toward defraying the expenses by purchasing a certain number of copies of the map for distribution among the delegates present at the Congress. The nomenclature adopted for the map is that of the U. S. Geological Survey, with which, unfortunately, the nomenclatures of the Canadian and Mexican Surveys do not correspond. The publication of this map is the first adequate step which has been taken toward filling a long-felt want. Professor A. C. Lawson, of the University of California, criticised the map for the manner in which the term Algonkian is used, saying that Eo-Algonkian is there made to comprise eras which are separated by the great Post-archæan unconformity, whereby an event of the utmost importance in the geological history of the North American continent is obscured.

Professor T. W. E. David, of the University of New South Wales, at Sydney, read a most interesting paper, illustrated with lantern-slides, on the glaciation of Australia during Palæozoic time. Striated erratic boulders occur in Lower Cambrian beds, but *roches moutonnées* have not been found. Striated boulders and *roche-moutonnéed* surfaces have been found in the Permo-Carboniferous strata of Australia, as well as in India, South Africa, and South America, indicating the wide extent of this Palæozoic glaciation. There has been found, too, evidence of Pleistocene glaciation in Australia. In another paper Professor David announced the discovery of diamonds in the matrix at Oakey Creek, Inverell, New South Wales.

In a paper entitled "Ueber die Klimaänderungen der geologischen Vergängenheit," Professor F. Frech of Breslau elaborated the theme that the climatic evolution of the world from Palæozoic times to the present epoch has always been in certain correlation with the changes in the proportions of carbonic acid gas and water vapour in the atmosphere. Increase in the amount of these two factors present in the atmosphere is due to volcanic exhalations, while decrease is caused by organic and inorganic chemical combinations, particularly the latter. General L. de Lamothe of Grenoble read a paper on "Le Climat de l'Afrique du Nord pendant le Pliocène et le Pleistocène." Dr. Marsden Manson of San Francisco read E. W. Hilgard's paper on "The Causes of the Glacial Epoch," in place of his own communication on "Les Climats des Temps Géologiques."

The foregoing topic, "Conditions of Climate in the Geological Epochs," was the only one of the several broad questions announced for consideration at the Congress which was discussed in at all the manner expected by the Committee of Arrangement. Most of the disputants listed for the four set topics failed to attend the meeting—a fact that was embarrassing to the Committee and disappointing to the Congress. Through an unfortunate misunderstanding the men whose names appeared on the programme were not called upon by name to open the discussion of geological climates, so that some carefully-prepared papers were not read, although their authors were present. Those who actually took part in the discussion on climates were Messrs. Philippi, Burckhardt, Frech, Rothpletz, Diener, Kerner, Vorwerg, Coleman, Allorge, Davis, Fairchild, Becker, Heilprin, and David. Professor G. Stefanescu of Bucharest gave a description of a complete skeleton of *Dinotherium gigantissimum* Stefanescu, the first remains of the species having been found by the author in 1888 at Manzati, Roumania.

The topic "The Origin of Ore Deposits" was considered in the following set papers: "Some Relations of Paleogeography to Ore Deposition in the Mississippi Valley," by Dr. H. F. Bain of Springfield, Illinois; "Sur la Relation entre l'État Propylitique (Grünstein) des Andésites et la Genèse des Filons liés à cette Roche," by Dr. B. von Inkey of Buda-Pest; "Ore Deposits at the Contacts of Intrusive Rocks and Limestones, and their significance as regards the general formation of veins," by Professor J. F. Kemp of New York; "Sur le Remplissage de quelques Gîtes Metallifères," by Dr. J. D. Villarello of Mexico; "Origin and Classification of Ore Deposits," by W. H. Weed of New York; and "Ore Deposition and Depth," by W. Lindgren of Washington. On account of the great development of the mining industry in Mexico and the keen practical interest in the question, such an array of papers naturally aroused animated discussion, which would have been much extended had time allowed. Those who took part in the discussion, aside from the authors of the papers read, were Messrs. Lawson, Becker, Bergeat, and Freudenberg.

The communication of J. G. Andersson, "On the Principal Results of the Swedish Antarctic Expedition," was read by Professor H. Sjögren of Stockholm, and illustrated by many interesting lantern-slides. Professor A. Heilprin of Philadelphia described the present condition of Mt. Pelé, as seen by him on a visit to Martinique last spring, and re-stated his belief that the new dome and spine are the solidification-plug of a previous eruption, pushed up to the surface during the series of eruptions that began in 1902. He considers this view to be proved by the coarsely-crystalline character of the fragments of the spine now to be found on the sides of the dome. The paper was illustrated with lantern-slides of new and old views. Dr. Tempest Anderson followed with an exhibition of lantern-slides from his photographs made on the Island of St. Vincent in 1902.

A timely paper was one by Professor A. C. Lawson of Berkeley on "The San Francisco Earthquake of 1906," in which were given the principal results thus far obtained by the State Earthquake Commission, of which he is chairman. The paper was illustrated by striking photographs showing the effects of the horizontal movement along the fissure which caused the quake, as well as the disastrous results of the vibrating motion in directions transverse to the fissure. Another timely communication, and on a subject not so familiar to American readers, was that by Dr. V. Sabatini of Rome "Sur la Dernière Éruption du Vésuve." The eruption was characterized by the enormous amount of ash and lapilli thrown out, which was thicker in a zone passing through Ottajano than it was either nearer the vent or farther away therefrom. The highest observed rate of flow of the lava streams was 66 meters per minute. It was estimated that 63,000,000 cubic meters of solid material were emitted by Vesuvius during the April eruption. Sand-flows like those of Pelé and mud-flows were noted. Dr. Sabatini's paper was illustrated with lantern-slides showing the main phenomena of the eruption, and was followed and supplemented by Dr. Tempest Anderson with a series of excellent stereopticon views of the same series of outbursts and their effects. In a paper entitled "Efemérides del Volcan del Colima," Presbyter S. Diaz of Guadalajara gave a résumé of continued observations of the outbursts of the volcano before, during, and after the eruption of 1903, and showed the great desirability of the establishment of a permanent observing station on that volcano. The other papers on the programme as read were: "Ueber den Verlauf der Geoisothermen in Bergen und seine Beeinflussung durch Schichtstellung, Wasserläufe und chemische Processe," by Professor J. Königsberger of Freiburg; "Interglacial Periods in Canada," by Professor A. P. Coleman of Toronto; "Geologic Classifications in the North Central Portion of the United States," by N. H. Darton of Washington; "Coon Butte, Arizona, its Meteoritic Origin," by Professor H. L. Fairchild of Rochester, N. Y.; and "The Western Sierra Madre of the State of Chihuahua," with lantern-slide illustrations, by Dr. E. O. Hovey of New York.

The International Committee on Glaciers reported through its chairman, Professor H. F. Reid of Baltimore, that the work of recording the movements and other phenomena of modern glaciers had been carried on systematically, and was being extended. No report was received from the "Committee on the Geological Map of Europe." The Committee on the Palæontologia Universalis reported through Professor F. Frech of Breslau that the work was being carried forward satisfactorily, and the Congress adopted his recommendation that the Committee expand the scope of its work to cover the republication entire of fundamental treatises in palæontology. Vacancies in the committee were filled by the election of Dr. R. Ruedemann for the United States and Drs. E. Böse and C. Burckhardt for Mexico.

The Committee on International Coöperation in Geological Investigations reported by letter through its chairman, Sir Archibald Geikie of England, that progress had been made toward conservation of energy along these lines. The Spendiaroff Prize was awarded to Dr. Th. Tschernyschew for his work entitled "Die Obercarbonischen Brachiopoden des Ural und des Timan." The following Committee was announced for the awarding of the prize for the next Congress: *Mexico,* Messrs. Aguilera (chairman), Böse, and Burckhardt; *United States,* Messrs. Osborn and Walcott; *Great Britain,* Sir Archibald Geikie; *France,* Professor Barrois; *Germany,* Professor Frech; *Austria,* Professor Diener; *Russia,* Dr. Tschernyschew. The theme proposed for the next competition for this valuable prize is "Description of a Fauna in connection with its Evolution and Geological Distribution." The suggestion of the Committee of Organization that the Congress publish an International Geological Review through subsidizing the Geologisches Centralblatt was referred by the Council to a Committee consisting of Messrs. Tschernyschew (chairman), Credner, Tietze, Low, Hayes, Barrois, Teall, Pellati, Aguilera, and Holm to report at the next Congress. The Council also adopted a strong recommendation to the next Congress that the excursions be confined to geologists, and elected a committee to formulate a plan for the more rigid supervision of matter offered for publication in the Compte-Rendu. The Congress adjourned to meet in Stockholm in 1909, or 1910, as may best suit the convenience of the Swedish committee.

The social side of the meeting was well cared for by the Mexicans. The evening before the beginning of the sessions was devoted to an informal dinner at the Chapultepec Restaurant, and the evening of the last day to a similar farewell dinner at Sylvain's Restaurant, in the city. Receptions were given at the Geological Institute, the Colonia Maria Club, and by the Minister of Fomento, an elaborate banquet was offered by the City of Mexico at the Municipal Palace, and a reception, followed by a dinner, was given by President Diaz in the Castle of Chapultepec. On the several excursions before, during, and after the sessions some twenty-five banquets were provided for the congressists on most lavish scale by Governors, municipalities, and mining men, and everything was done to make the foreigners feel at home and see all that could be seen in the time available of the geology and mines of the Republic. The Government, too, was practically the host of the Congress on the long excursions, since the fee paid by the participants was only about one-third the actual expense, the remainder being met out of the federal treasury. The Government also provided for half-fare rates for the congressists on all the railways of Mexico and for similar concessions on certain steamship lines from Europe, the United States, and South America.

The most important feature of the International Geological Congress is, probably, the excursions. In this respect the Mexican Congress was particularly good on account of the great variety which could be offered in the lines of vulcanology, tectonic geology, stratigraphy (particularly from the Upper Jurassic upwards), mining geology, and physiography, to say nothing of beautiful scenery, and all sorts of vegetation, from the scantily-covered desert and semi-arid upland to the dense tropical forests of the moist coastal plains of the Tierra Caliente. Ethnologists had several kinds of Indian tribes to observe; while for the persons interested at all in archæology the famous ruins were full of fascination. The rainy season was still on during the period of most of the excursions, which added greatly to the difficulty of carrying out the programmes on account of delays due to soft track and washouts; but very few features of the whole long list were wholly lost. On the other hand, the showers cleared the atmosphere and rendered the mountains more beautiful.

Before the actual sessions of the Congress there were three excursions in south-central Mexico. The first party went to Oaxaca, examining *en route* the Archæan rocks of the cañon of Tomellin under the guidance of Dr. E. Ordoñez. From Oaxaca the great ruins of Mitla were visited, under the leadership of Professor E. Seler, the famous Americanist of Berlin. On the return to Oaxaca the party divided, most of the members hurrying back to Mexico City and thence to Morelia, to join either the Jorullo or the Colima excursion; so few of the original number were left, in fact, that the visits to the fossiliferous (Lower Cretaceous) localities of Zapotitlán and San Juan Raya were abandoned. The second excursion was to the volcano of Toluca, with Mr. T. Flores as leader, and to Jorullo, under the guidance of Dr. Ordoñez. Toluca is fourth in point of height among the mountains of Mexico, being a little less than 15,000 feet in altitude. Its crater contains one of the very highest bodies of water (elevation about 14,000 feet) in North America. The last phase of activity of the volcano was the exudation of a dome of lava within the crater which was too viscous to flow as a stream—the counterpart of the new dome of Mt. Pelé, Martinique. A few of the party climbed to the summit of Xinantihuatl, as the highest part of the rim of the volcano is called, and enjoyed thence a wonderful view of volcanic cones and craters, plains and woodlands, from the dense forests south and west of the peak to snow-clad Popocatepetl and Ixtaccihuatl in the east. From Toluca we went to the beautifully-situated, quaint old city of Morelia, where we joined the excursionists from the hot springs of Agua Fria and the extinct geysers of San Andres, who had had an interesting trip with Dr. P. Waitz as guide, but a very hard one, on account of heavy rains.

From Morelia the Jorullo party, under Dr. Ordoñez, was favoured by good weather and reported a wonderful trip, the members being particularly impressed by the view from the Hacienda Mata de Plátano across the Tierra Caliente to the Sierra Madre del Sur beyond the volcano of Jorullo. From Morelia the Colima party, under Dr. Waitz, proceeded without stop to Zapotlan, it being impracticable to visit the geyser region of Ixtlan on account of the heavy rains, which had rendered the trails impassable for a large party of horsemen. At Zapotlan a day was lost on account of heavy rain in the morning; but Tuesday, August 28, the party was favoured by sufficiently good weather to make the start for the volcano, and the ten-hour ride through the forest over the pass of the Nevado de Colima to the camp at 10,800 feet elevation, fronting the volcano itself, was one never to be forgotten. The view from the pass includes the active cone (12,669 feet in altitude) and the Tierra Caliente below, quite to the Pacific Ocean at Manzanillo and westward. Fourteen of the party climbed to the top of Colima on August 29, and most of the number entered the old summit crater. This crater is filled with the block lava of the 1903 eruption, and through the crevices between the blocks live steam is issuing in such volumes that it would probably be impracticable to reach the top of the new cone within the old crater. The newspaper report regarding injury to the party was entirely without foundation in fact. On Toluca and Colima the geologists found that the State Governments had erected substantial log or slab cabins expressly for their protection against the cold nights, while the Congress guides had made every other provision for comfort.

All the excursionists assembled again in the City of Mexico on September 1, and the following day joined with new arrivals in starting upon the "Excursion to the East." The first day was occupied with the journey to Jalapa, the most interesting feature of which was the view of the recent volcanic phenomena of the Texcoco basin, in which lies Mexico City. The second day the party was divided into two sections, one of which went with Dr. Ordoñez as guide to the Cañon and Falls of Texolo, where is developed abundant electric power for use at Jalapa. The falls are double, consisting of an upper one of 50 feet and a lower of about 100 feet through a rift in the edge of a great flow of andesitic lava. A neighbouring gorge, 256 feet deep and less than 50 feet wide, cut through the same bed of andesite by the main river, is picturesque and interesting. The other section of the party, under the leadership of Dr. E. Böse, went to Carrizal, and there took horses for a ride through the barranca of Santa Maria Tatetla. Palæopliocene fossils were obtained by some of the party, but the principal interest of the day lay in the scenery and the dense tropical forest along the route. The third day was spent at Orizaba and in reaching the plateau again through the famous gorge traversed by the Mexican Railway. The tectonic features of the region were explained by Dr. Böse.

Four single-day excursions were offered gratuitously during the sessions. The first was, on September 7, to the extensive basalt flow known as the Pedregal of San Angel, which is prehistoric as to recorded age, but which came from the region of Mt. Ajusco and overwhelmed human beings and covered pottery in its advance. On September 9 the congressists were the guests of the Geological Society of Mexico on a trip to Cuernavaca, where they were entertained by the municipality at a banquet given in the historic Palace of Cortés. The journey is one that is famous for the beauty of the scenery along the route. Tuesday, September 11, was devoted to visiting the prehistoric pyramids of the Sun and the Moon near San Juan Teotihuacan, where the members of the Congress were the guests of the Minister of Public Instruction and Fine Art. A highly-romantic feature of this day was the dinner given in the grotto "Porfirio Diaz," which is thought to have been excavated by the builders of the pyramids for material for those huge structures. The fourth excursion was given on Thursday, September 13, to the famous silver mines of Pachuca by the Compañia de Minas del Real del Monte y Pachuca, with a banquet at Pachuca given by the Governor of the State of Hidalgo.

Anything like a complete account of the great nineteen-day excursion through the northern portion of the Republic after the adjournment of the Congress would be too long for insertion in these pages, and only an outline sketch can be attempted. The congressists, to the number of 111, left Mexico City Saturday evening, September 15, in two luxurious Pullman trains. The trains were unusually heavy and the track very soft, so that their normal condition was that of being behind time. The first stop was at El Valle de Santiago, where Dr. Ordoñez conducted the party to some of the craters of explosion which characterize the valley. These are volcanic craters which seem to have been formed by single outbursts of steam. The following day, Monday the 17th, was spent at the famous old mining town of Guanajuato, which creeps up the sides of a great gulch and its tributaries four miles from Marfil, the nearest railroad station. Fabulous quantities of silver ore have been taken from the ground in this district. The Congress party was divided into three sections—one for surface geology under Dr. Waitz and two for mines under Messrs. Villarello, Flores, and Robles. It was quite a novel experience to walk down steps for a vertical distance of 800 feet into a mine (the Cata), and it was difficult to realize that for three centuries the only way of getting ore out of that mine was on the backs of men and up those long stone steps.

Tuesday was spent at the attractive little mining city of Zacatecas, where one section of the party devoted itself to the surface geology under the leadership of Dr. C. Burckhardt and saw interesting series of fossiliferous beds of Upper Triassic age associated with schists of possibly greater antiquity and with diabase and intrusive and effusive acidic rocks (quartz porphyry). The Bote silver mine was visited by a group of the congressists, with Mr. Flores as guide. The next day the great lead-silver mine and smelter of Mapimí were seen, with Dr. Villarello as scientific leader. The ores carry much arsenic, and present some interesting problems in treatment, which are being handled in an up-to-date manner. The mines are deep for the country, being worked down to the 700-meter level.

Conejos was the next stop on the programme, and there, under the guidance of Dr. Böse, the party saw the surface geology and underground workings of the only known workable deposit of sulphur in the Republic. The sulphur is associated with a fault in the Cretaceous limestones and marls, and seems to be the result of hot-spring action rather than a reduction from gypsum. Friday, September 21, was spent in and near El Paso, Texas, the geological feature of the day being a reconnoissance of the laccolith and associated fossiliferous Cretaceous beds forming the Cerro de Muleros, with Dr. Böse as guide. Saturday was devoted to the city of Chihuahua, and Sunday to the mines and geology of the vicinity of Parral. Dr. Waitz led the party on the surface; while Dr. Robles led that which visited the Cobradilla silver mine, one of a great group of mines on the important "Veta Colorado," which lies between walls of rhyolite and related rocks.

Washouts prevented the party from going to Parras, and soft track and a washout delayed the trains so that the day was consumed in getting to Saltillo. Between Torreon and Saltillo portions of the Bolson de Mapimí that were said not to have known a drop of water for twenty-five years formed shallow lakes aggregating hundreds of square miles in extent. The three days, September 25-27, which were devoted to the horseback and foot trips from Concepcion del Oro to Mazapil and the Sierra de Santa Rosa formed a memorable part of the whole northern excursion. Study of the geology was under the guidance of Dr. Burckhardt, and included splendid examples of upturned and completely overturned Upper Jurassic and Lower Cretaceous strata and beautiful mineralized zones of the contact metamorphism between the limestones and a large intrusive mass of diorite. Along the contact lie the valuable oxidized and sulphide copper ores which are being exploited by the Mazapil Copper Co., whose mines were visited under the leadership of Dr. Villarello. Friday, September 28, was devoted to Las Esperanzas, Coahuila, where the geological relations of the Upper Cretaceous exposures were explained by Dr. Aguilera; while the coal mines were visited, with Mr. E. Ludlow, of the Mexican Coal and Coke Co., as guide. The coal is of Upper Cretaceous age, and occurs in a bed about six feet thick in three basins near Las Esperanzas. It forms an excellent fuel—for a Cretaceous coal—and much of it is burned into coke. Saturday was spent at Monterrey, where the great smelter, the iron works, and the electric silver reduction plant were visited.

Sunday passed in travel, and Monday was devoted to the geology of the eastern edge of the plateau, from Cárdenas down to the coastal plain. From Cárdenas to Canoas the section was made on foot, with Dr. Böse as leader. The strata are of Upper Cretaceous age, and some of the beds are highly fossiliferous, so that many excellent specimens were carried away by the congressists. The ride from Las Esperanzas to Monterrey, and particularly that from Cárdenas through the Tamasopo and Micos cañons, were impressive in their display of the great thickness of Cretaceous limestone along the eastern portion of the plateau region and the amount of folding and faulting that the beds have suffered. The night was spent at Tampico, and on Tuesday the trains returned through the wonderful cañons, stopping *en route* to allow the passengers to go down into the picturesque Grotto of Choy, which lies directly beneath the railroad track in the limestone escarpment facing the wide coastal plain. A portion of the Congress party, led by Dr. Ordoñez and Mr. Doheny, stopped to examine the oil fields near Ebano, thirty-four miles west of Tampico. The wells are about 425 feet deep, and bring the oil up from Tertiary (Miocene?) beds. The oil is of very high specific gravity, with heavy asphaltic base. Only the gushing wells are utilized at present, and the production is about 1,500 barrels per day. Most of the oil is sold crude to the Mexican Central Railway for locomotive fuel. The remainder is refined, the distillates being sold to the Waters-Peirce Oil Co., and the asphalt being used for pavements in Mexico City and elsewhere. Wednesday was devoted to the smelter at San Luis Potosi and the city itself, and by noon of Thursday both trains had discharged their load of well-satisfied congressists in Mexico City.

Saturday morning, October 6, about sixty-five of the congressists left Mexico City for a visit to the Isthmus of Tehuantepec as the guests of Sir Weetman D. Pearson, the head of S. Pearson & Son, the great English firm of engineers and contractors having in charge the extensive improvements along the Tehuantepec Railway and the harbour works at Coatzacoalcos and

Salina Cruz, which have been provided for by the Mexican Government by appropriations amounting to about $32,500,000 gold during the past five or six years. Seven days were devoted to the trip under the scientific guidance of Dr. Böse, and the complete section across the isthmus was seen from the Pliocene of the Atlantic slope through the upper Miocene and the middle Cretaceous to the crystalline schists and the associated metamorphosed limestones of the heart of the "sierra" between Rincon Antonio and Chivela, the granitic and porphyritic rocks of San Gerónimo, the Archæan gneisses and granites of Tehuantepec and the granitic intrusive rocks of Salina Cruz. The excursionists were greatly impressed with the extent and completeness of the preparations made at both harbours and along the railroad for handling the enormous quantities of freight that are expected as soon as the route is thrown open to traffic on January 1, 1907.

The very end of the Congress was saddened by the death from typhoid fever on Sunday, October 14, of Dr. Franz Stradal of Vienna, Austria. Dr. Stradal was one of the younger members of the Congress, being only 27 years old, but he was a geologist of promise. He contracted the fever on the northern excursion, but he did not leave the party and go to the American Hospital in Mexico City until it was too late to save his life.

PHYSIOGRAPHY OF VIRGINIA.

BY

G. T. SURFACE, M.S.

The surface features are so closely connected with the geological history, and this in turn is so important in the determination of economic control, that we will discuss the physiographic phase from the view-point of geologic grouping and sequence. It is our purpose to give the reader a consistent portrayal of the Virginia land-mass at logical intervals during its physiographic evolution. The conclusions arrived at are based upon the most accurate information obtainable, in the absence of a complete topographic or physiographic survey of the State. As viewed from the standpoint of origin the land-mass divides itself into two major divisions: I. Appalachian Belt; and, II. Coastal Plain Belt.